Arabian Sea Circulation Simulated With 2-Day and 1-Month Mean NSCAT Wind Velocity Data

D. Halpern
Jet Propulsion Laboratory
California Institute of Technology
Pasadena, CA 91109-8099

A wind-measuring scheme must not only be accurate in regards to the quality of each measurement but also must resolve the rich space and time spectra of wind motions. For many oceanographic applications, the desired accuracy would be 1 m/s for the east-west and north-south wind components (or 1.5 m/s and 4 degrees for speed and direction), 1-day resolution, and 25-km horizontal scale. NSCAT wind velocity vectors are measured with a 25-km x 25-km footprint every 2 days (sometimes more often) over 98% of the global ocean. An experiment with NSCAT data is described to illustrate differences in wind-driven ocean circulation derived from 2-day and 1-month mean data, For this report, data from the Arabian Sea are employed. Three components of wind-driven circulation of the Arabian Sea were computed: vertical transport of water across the bottom of the Ekman layer north of 8“N, which is related to wind stress curl and zonal component of Ekman transport; north-south component of Ekman transport along the southern boundary at 8.5°N, which is related to zonal wind stress component; Sverdrup transport along 8.5°N, which is related to wind stress curl. Differences between the mean of fifteen 2-day values and a 30-day mean value were as large as 40% for transports computed from wind stress curl because large wind stress curls occurred for short time intervals. Also, differences between wind-driven ocean transports computed with 25-km x 25-km wind stresses and with 10 x 10 wind stresses will be discussed.